

FIG. 1

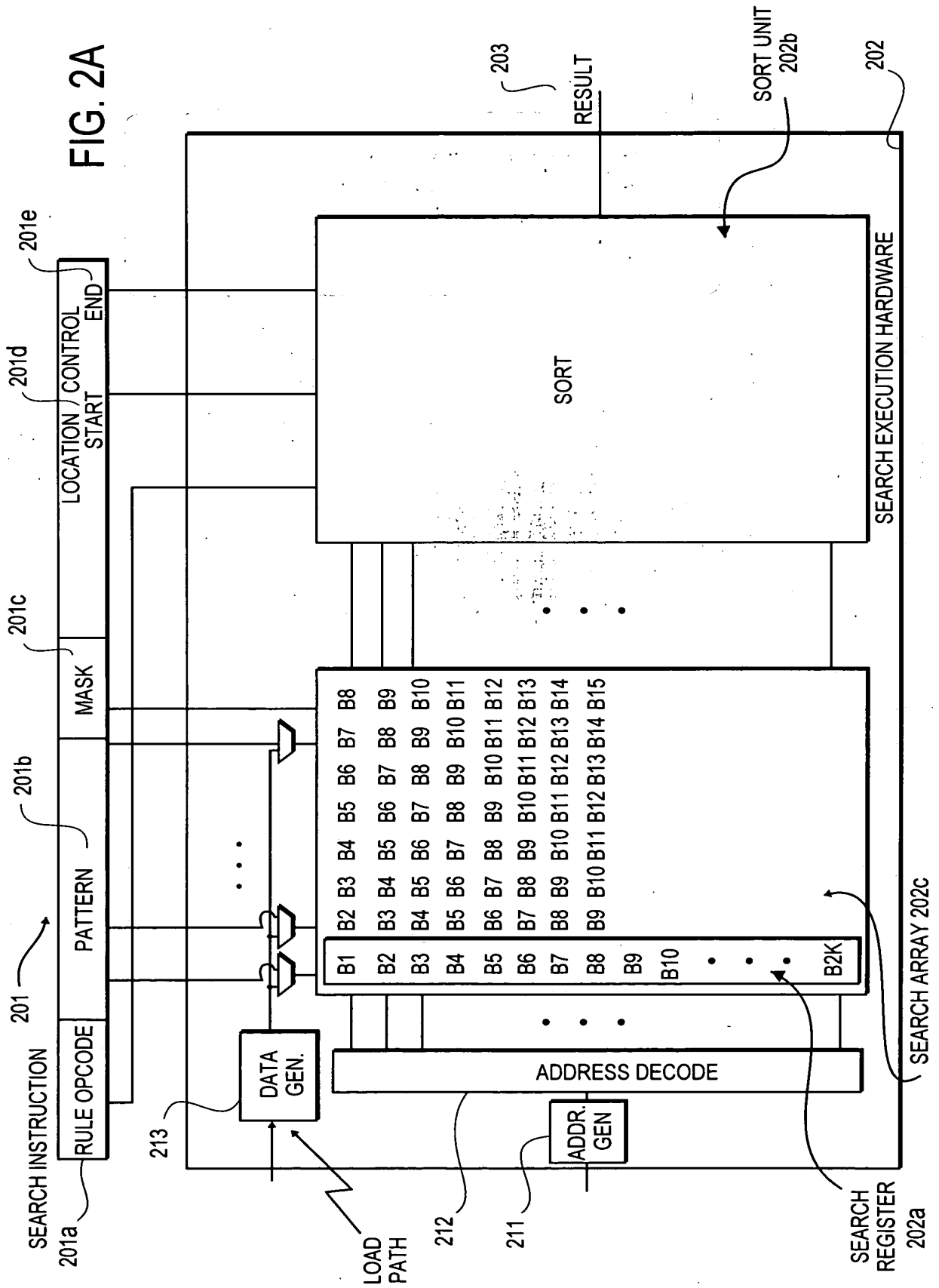
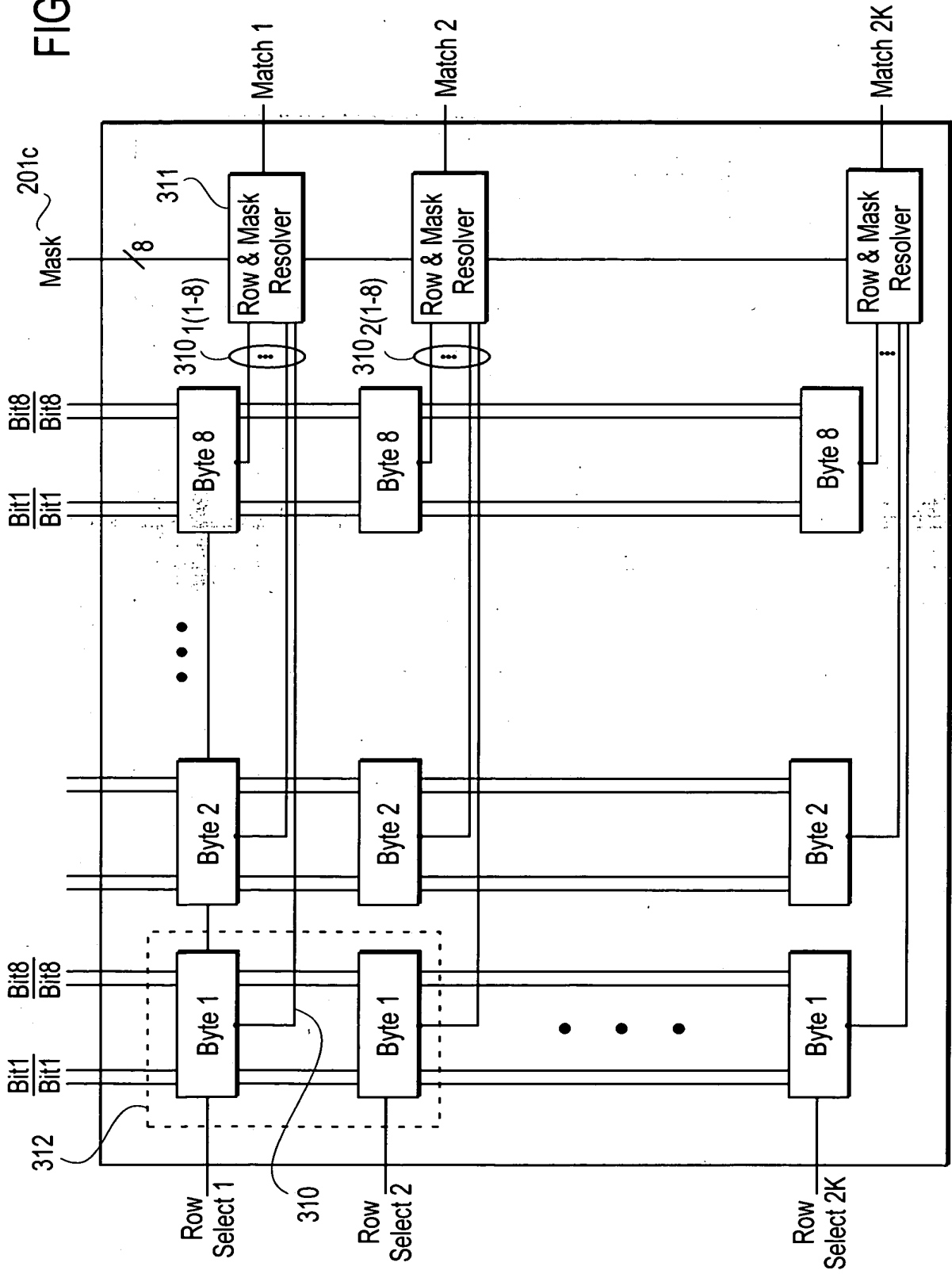


FIG. 2B



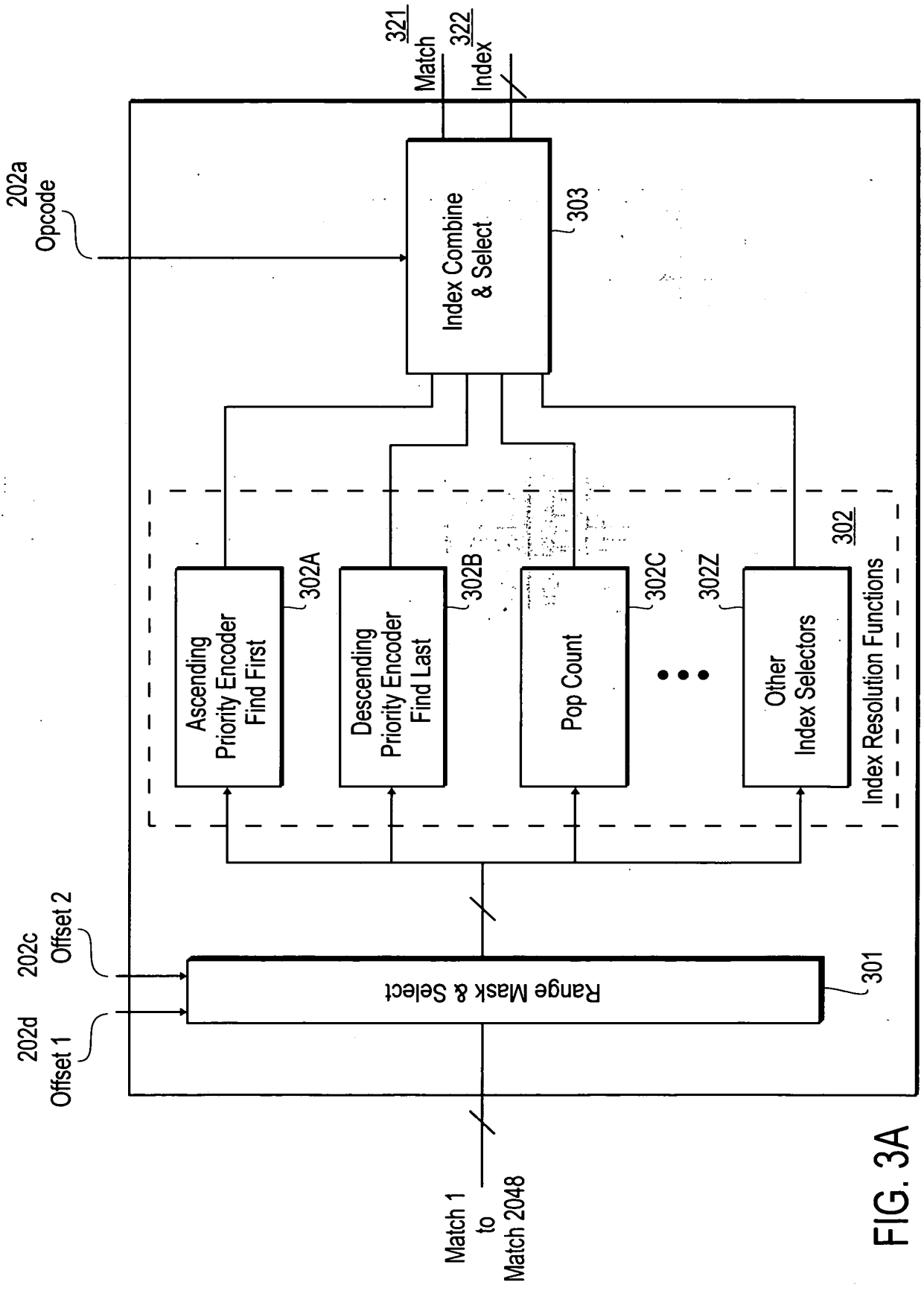


FIG. 3A

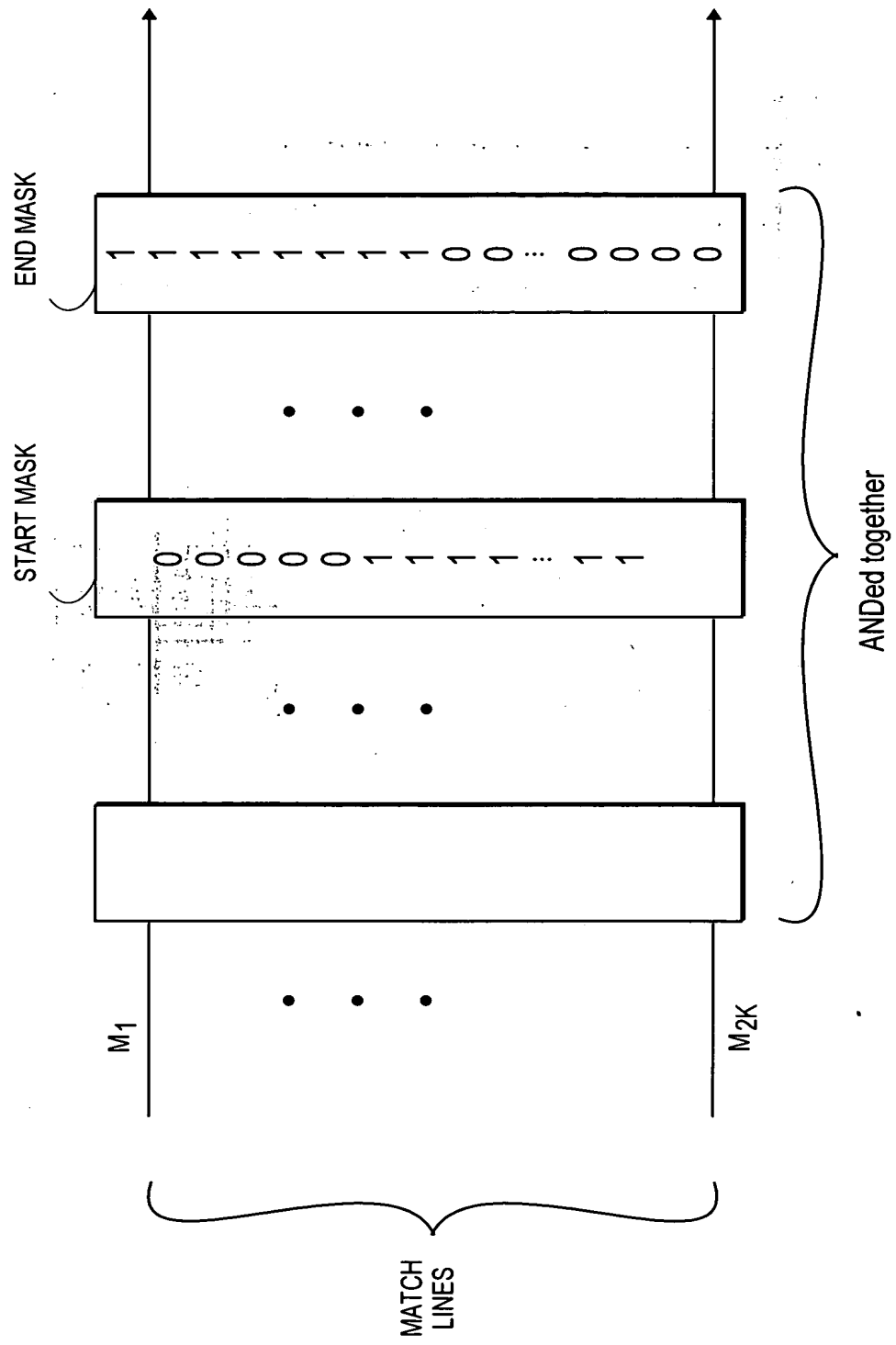


FIG. 3B

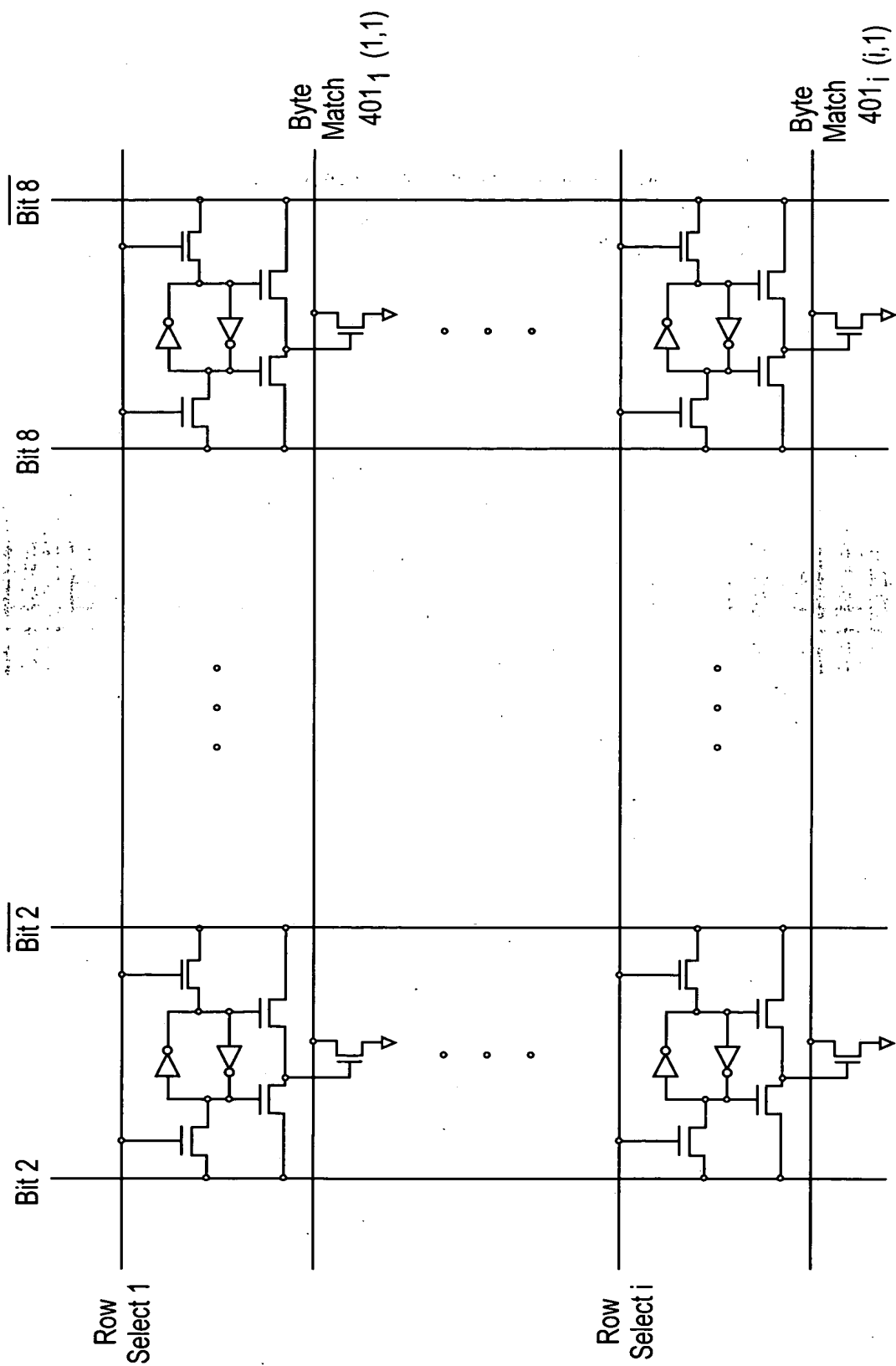


FIG. 4

Microarchitecture Diagram

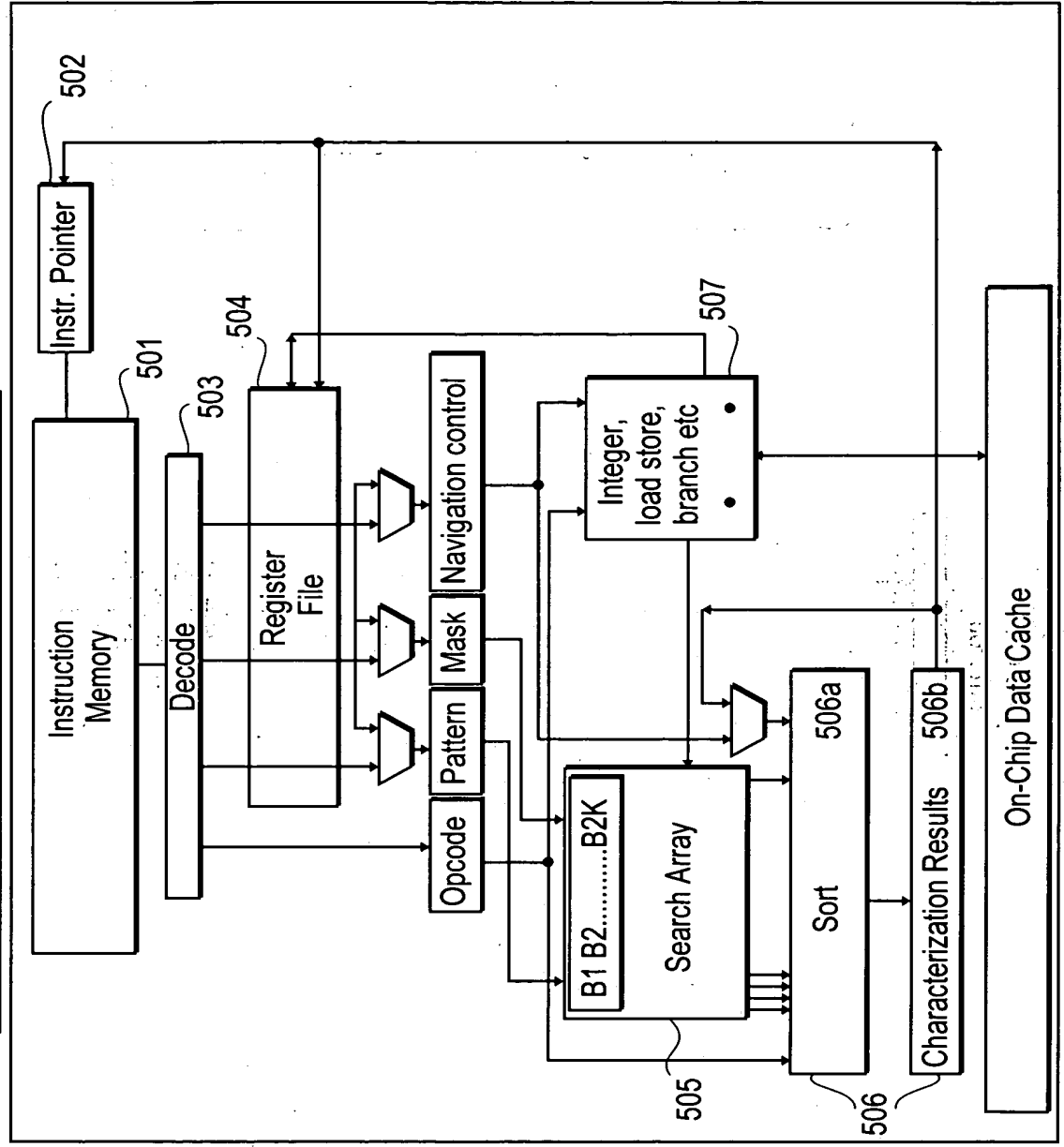


FIG. 5

- 508 Fetch
- 509 Reg File Read & Rule Assembly
- 510 Execute/Search
- 511 Sort & Branch

Example pseudo-code and Rule Engine micro-code

Pseudo-code

FIND ("cp /bin/sh /usr/spool/mail/root" BEFORE "chmod 4755 i\$") AND "touch" BEFORE "mail"

Micro-code for an exemplary Rule Engine

	Opcode	Pattern	Mask	Start Offset	Start Offset Indirect	End Offset	End Offset Indirect	Result Register	Branch Address
1	FIND_FIRST_FORWARD	"cp /bin/"	0xFF	0x03D	0	0x800	0	A	0xB
2	FIND_FORWARD_ANCHORED	"sh /usr/"	0xFF	<A + 8>	1	0x800	0	A	0xB
3	FIND_FORWARD_ANCHORED	"spool/ma"	0xFF	<A + 8>	1	0x800	0	A	0xB
4	FIND_FORWARD_ANCHORED	"ll/root"	0xFE	<A + 8>	1	0x800	0	A	0xB
5	FIND_FIRST_FORWARD	"chmod 47"	0xFF	<A + 7>	1	0x800	0	A	0xB
6	FIND_FORWARD_ANCHORED	"55 i\$"	0xF8	<A + 8>	1	0x800	0	A	0xB
7	FIND_FIRST_FORWARD	"touch"	0xF8	0x03D	0	0x800	0	B	0xB
8	CMP(B+5, A+5)_BRANCH(10)	-	-	-	-	-	-	-	0xA
9	FIND_FIRST_FORWARD	"mail"	0xF0	<A + 5>	1	0x800	0	C	0xB
10	FIND_FIRST_FORWARD	"mail"	0xF0	<B + 5>	1	0x800	0	C	0xB

FIG. 6

Execution of example micro-code: pipeline diagram

Clock 14	-	-	-	10
Clock 13	-	-	10	-
Clock 12	-	10	-	-
Clock 11	10	-	-	-
Clock 10	-	-	-	8
Clock 9	-	-	8	7
Clock 8	-	8	7	6
Clock 7	8	7	6	5
Clock 7	7	6	5	4
Clock 6	6	5	4	3
Clock 5	5	4	3	2
Clock 4	4	3	2	1
Clock 3	3	2	1	-
Clock 2	2	1	-	-
Clock 1	1	-	-	-
	Fetch	Assemble	Search/ Execute	Sort & Branch

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FIG. 7